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Notes on *Amylocorticiellum* (*Amylocorticiales, Basidiomycota*), with some new combinations

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Abstract — A review of the known species in *Amylocorticiellum* is provided. *Amylocorticiellum molle* is reported as new to Argentina as well to the Southern Hemisphere. Three combinations in *Amylocorticiellum, A. iaganicum, A. luteolum,* and *A. oblongisporum,* are proposed, and a key to all accepted species is provided.

Key words — corticioid fungi, *Hypochniciellum*, Patagonia, spore amyloidy, taxonomy

Introduction

Amylocorticiellum Spirin & Zmitr. was described to accommodate species with corticioid basidiomes, smooth thick-walled basidiospores, and amyloid spore walls (greyish to bluish in Melzer's reagent), with *Corticium subillaqueatum* as the generic type species (Zmitrovich & Spirin 2002). In addition, two other species formerly placed in *Hypochniciellum* Hjortstam & Ryvarden, *Corticium cremeoisabellinum* and *Thelephora mollis*, have been transferred to *Amylocorticiellum*, and *A. sinuosum* was described as a new species (Zmitrovich & Spirin 2002). *Hypochniciellum* originally included only *Leptosporomyces ovoideus* Jülich, characterized by thick-walled and cyanophilous basidiospores that are negative in Melzer's reagent (Hjortstam & Ryvarden 1980). Hjortstam (1981) later emended the generic circumscription to include species with thick-walled basidiospores with greyish walls that are not distinctly blue in Melzer's reagent. There are few reliable characters separating *Amylocorticiellum* and *Hypochniciellum* except for the basidiospore amyloidy reaction. The fact that some corticioid genera contain species with both amyloid and non-amyloid basidiospores (e.g., *Scytinostroma* Donk, *Vararia* P. Karst.) while elsewhere spore amyloidy is reliably diagnostic at the generic level has been supported by molecular analysis (e.g., both *Aphanobasidium* Jülich and *Amyloxenasma*

(Oberw.) Hjortstam & Ryvarden produce smooth basidiospores that are amyloid in the latter). It is noted that *Hypochniciellum ovoideum* (Jülich) Hjortstam & Ryvarden grows on both hardwood and conifer wood while almost all species in *Amylocorticiellum* show a strong association with conifers.

Molecular studies support *Amylocorticiellum subillaqueatum* (type species of *Amylocorticiellum*) in the *Amylocorticiales* K.H. Larss.et al., closely related to the monotypic genus *Podoserpula* D.A. Reid (Binder et al. 2010). A BLAST search of the LSU rRNA partial sequence of *Amylocorticiellum molle* available in Genbank suggests that it is closely related to *Amyloathelia crassiuscula* Hjortstam & Ryvarden (96% coincidence) and *Corticium subillaqueatum* (95%). *Hypochniciellum ovoideum*, is still not molecularly analysed (Larsson 2007). The recently proposed order *Amylocorticiales* has been shown to be sister to the *Agaricales* s.l., suggesting that the radiation of pileate stipitate mushrooms resulted from the elaboration of resupinate ancestors (Binder et al. 2010). Most taxa referred to the *Amylocorticiales* (cf. Binder et al. 2010) have amyloid spore walls. As several genera in this order appear to be non-monophyletic, a sound generic classification within the *Amylocorticiales* awaits more intensive sampling, especially from species that have not yet been sequenced.

To date, four species have been placed in *Amylocorticiellum*. Three more species with smooth, thick-walled, amyloid basidiospores are still referred to *Hypochniciellum*: *H. luteolum* from Colombia (Hjortstam & Ryvarden 2000), *H. iaganicum* from the Patagonian Andes forest (Greslebin 2002), and *H. oblongisporum* from South Argentina and New Zealand (Greslebin & Rajchenberg 1999). It has not been possible to perform molecular studies of the South American species because we had no success in getting pure cultures and/or DNA extraction. Nonetheless, we transfer these three species to *Amylocorticiellum*, based on their morphology, leaving *Hypochniciellum* in its restricted sense of the generic type. We also review the known *Amylocorticiellum* species and provide a key for their identification.

Material & methods

For light microscopic studies, samples were mounted in 3% potassium hydroxide (KOH), Melzer's reagent (IKI), and 0.1% cotton blue in 60% lactic acid to determine basidiospore cyanophily. Line drawings were made with a camera lucida attachment. Specimens are deposited in the Centro de Investigación y Extensión Forestal Andino Patagónico (CIEFAP, Esquel, Argentina) herbarium. For species distribution in the Southern Hemisphere we follow Hjortstam & Ryvarden (2007).

Taxonomy

Amylocorticiellum Spirin & Zmitr., Mikol. Fitopatol. 36(1): 22, 2002.

Type species: *Corticium subillaqueatum* Litsch.

Basidiome resupinate, effused, pellicular to membranaceous, margin fibrillose. Hymenophore smooth to merulioid or hydnoid, light coloured. Hyphal system monomitic, hyphae with evident clamps, thin- to thick-walled in the subiculum. Cystidia usually absent, or present often poorly differentiated. Basidia clavate, sinuous, with a basal clamp. Basidiospores cylindric to ellipsoid, smooth, thick-walled, with a greyish to bluish reaction in Melzer's reagent, cyanophilous. On coniferous wood, causing a brown rot.

Amylocorticiellum cremeoisabellinum (Litsch.) Spirin & Zmitr., Mikol. Fitopatol. 36(1): 22, 2002.

≡ *Corticium cremeoisabellinum* Litsch., Ann. Mycol. 39(2/3): 117, 1941.

≡ *Hypochniciellum cremeoisabellinum* (Litsch.) Hjortstam, Mycotaxon 13(1): 125, 1981.

≡ *Leucogyrophana cremeoisabellina* (Litsch.) Parmasto, Eesti NSV Tead. Akad. Toim., Biol. seer 16(4): 385, 1967.

Comments – *Amylocorticiellum cremeoisabellinum* is characterized by a white to cream-brown pellicular basidiome, ellipsoid basidiospores that are inamyloid or slightly greyish in Melzer's, and the lack of cystidial elements. For a detailed description and illustration see Eriksson & Ryvarden (1976) and Kotiranta & Saarenoksa (1990).

Known from continental Europe and Russia. Two specimens from Tierra del Fuego (Argentina) previously reported (Hjortstam & Ryvarden 1985) have since been referred to *H. iaganicum* (Greslebin 2002).

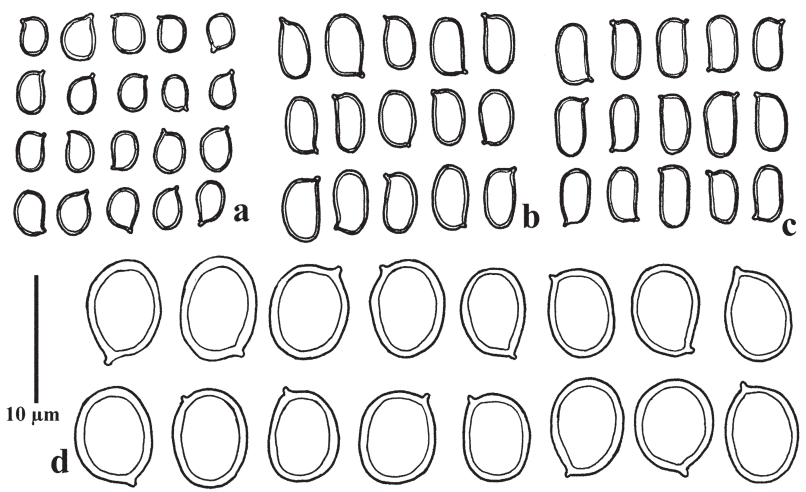

Plate 1. Basidiospores. a) *Amylocorticiellum luteolum* LR 15952; b) *A. molle* SPG 2991; c) *A. oblongisporum* SPG 2933; d) *A. iaganicum* AG 1507.

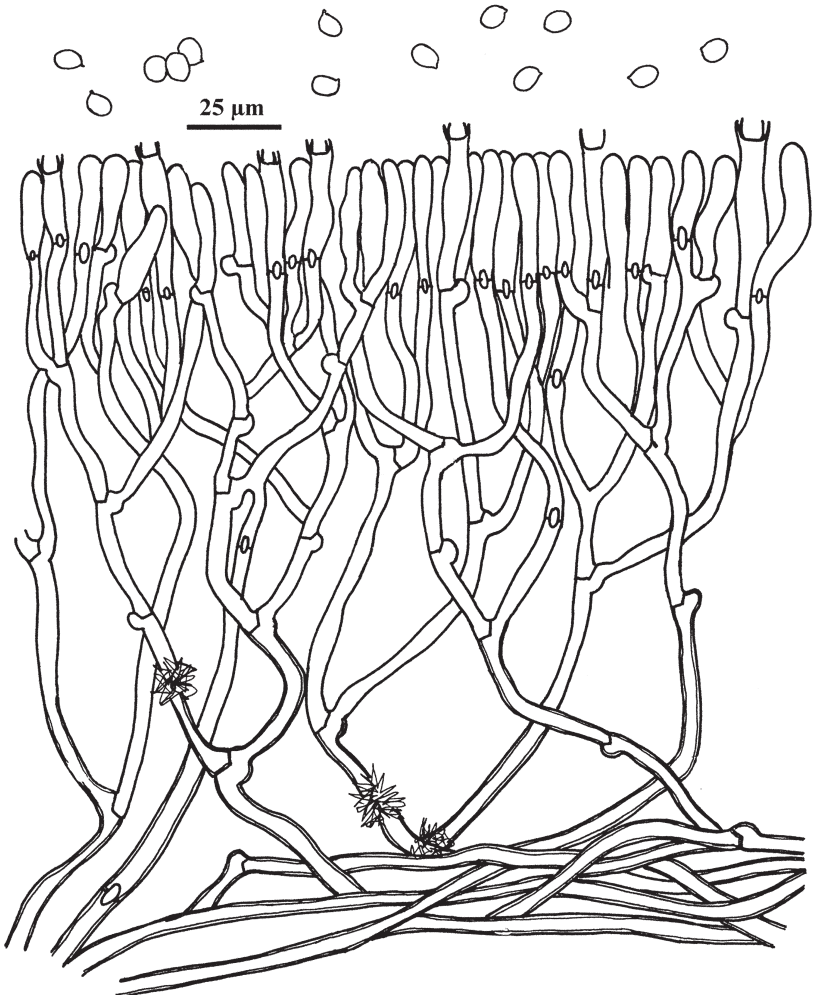

Plate 2. *Amylocorticiellum iaganicum* (coll. AG 1507)

Amylocorticiellum iaganicum (Speg.) Gorjón, Gresleb. & Rajchenb., **comb. nov.**

MycoBank MB519219 Plates 1,2

≡ *Corticium iaganicum* Speg., Bol. Acad. Nac. Cs. Córdoba 11(2): 172, 1888.

≡ *Hypochniciellum iaganicum* (Speg.) Rajchenb. & J.E. Wright, Mycologia 79(2): 247, 1987.

Description – Basidiome resupinate, byssoid, detachable from the substrate, 130–400 µm thick; hymenial surface smooth, white, cream, ocassionaly with ochraceous tints; margin thinning out or abrupt. Hyphal system monomitic, hyphae with clamps, 3–5 µm in diam., thin- to thick-walled in the subiculum, asterocrystals sometimes present. Basidia clavate, with constrictions or sinuous, 25–35 × 5–7 µm, guttulate, with 4 sterigmata, and a basal clamp. Basidiospores ellipsoid, 6–9 × 4–6 µm, thick-walled, smooth, amyloid, the outer part of the wall reacting in Melzer's reagent while the inner one remains unchanged, cyanophilous.

Representative specimens examined – **ARGENTINA. Chubut**: Tehuelches, Senguerr river, La Plata lake, on dead branches or logs of *Nothofagus pumilio* (*Nothofagaceae*), 21-22.X.1993, leg. M. Rajchenberg & A. Greslebin, *MR 10785, MR 10789*. Los Alerces National Park, Futalaufquen lake, Irigoyen waterfall stream, on *Nothofagus dombeyi* (*Nothofagaceae*), 19.VI.1997, leg. M. Rajchenberg, *MR 11269*. Languiñeo, Engaño lake, on *N. pumilio,* 2.V.1997, leg. A. Greslebin, *AG 917, 947*. **Neuquén**: Maipú, Lote 42 y 43 ca. Laguna Rosada, on *N. pumilio,* 2-3.XI.1997, leg. A. Greslebin, *AG 1187, 1268, 1311*. **Río negro**: Nahuel Huapi National Parkl, Challhuaco Valley, on *N. pumilio*, 29.X.1997, leg. A. Greslebin, *AG 1094*. **Tierra del Fuego**: Río Grande, Estancia Esperanza, close to Esperanza lake, on *Nothofagus antarctica* (*Nothofagaceae*), 24.II.1998, leg. *A. Greslebin*, *AG 1507, 1508*. Ushuaia, Estancia Moat, Chico river, on *Nothofagus betuloides* (*Nothofagaceae*), 26.III.1998, leg. *A. Greslebin*, *AG, 1524, 1527*. **CHILE. Tierra del Fuego**: on *Maytenus magellanica* (*Celastraceae*), *LPS 3725,* **holotypus**.

Comments – *Amylocorticiellum iaganicum* is morphologically close to *A. cremeoisabellinum* but differs in its larger and distinctly amyloid basidiospores.

Known from southern Argentina and Chile.

Amylocorticiellum luteolum (Hjortstam & Ryvarden) Gorjón, Gresleb. & Rajchenb., **comb. nov.** Plates 1,3

MycoBank MB519220

≡ *Hypochniciellum luteolum* Hjortstam & Ryvarden, Mycotaxon 74(1): 247, 2000.

Description – Basidiome resupinate, pellicular, soft, easily detachable, hymenophore smooth, pale yellowish, margin indeterminate. Hyphal system monomitic, hyphae with clamps, subhymenial hyphae thin-walled, 2–3 µm in diam., subicular hyphae thin-walled, 2–4 µm wide. Cystidia absent. Basidia subcylindric, (10–)12–20 × 3.5–4 µm, with four sterigmata, and a basal clamp. Basidiospores short ellipsoid to subglobose, 2.5–3(–3.25) × 2–2.25 µm, smooth, with distinct to thickened walls, amyloid, acyanophilous or with a weak reaction in cotton blue.

Specimen examined – **COLOMBIA**. **Magdalena**, Sierra Nevada de Santa Marta, Reserva Forestal San Lorenzo, on wood, 17-19.VI.1978, leg. L. Ryvarden, *LR 15952* (**isotypus** GB-008 9325).

Comments – *Amylocorticiellum luteolum* is characterized by a pale yellowish pellicular basidiome, the absence of cystidial elements, and small basidia and

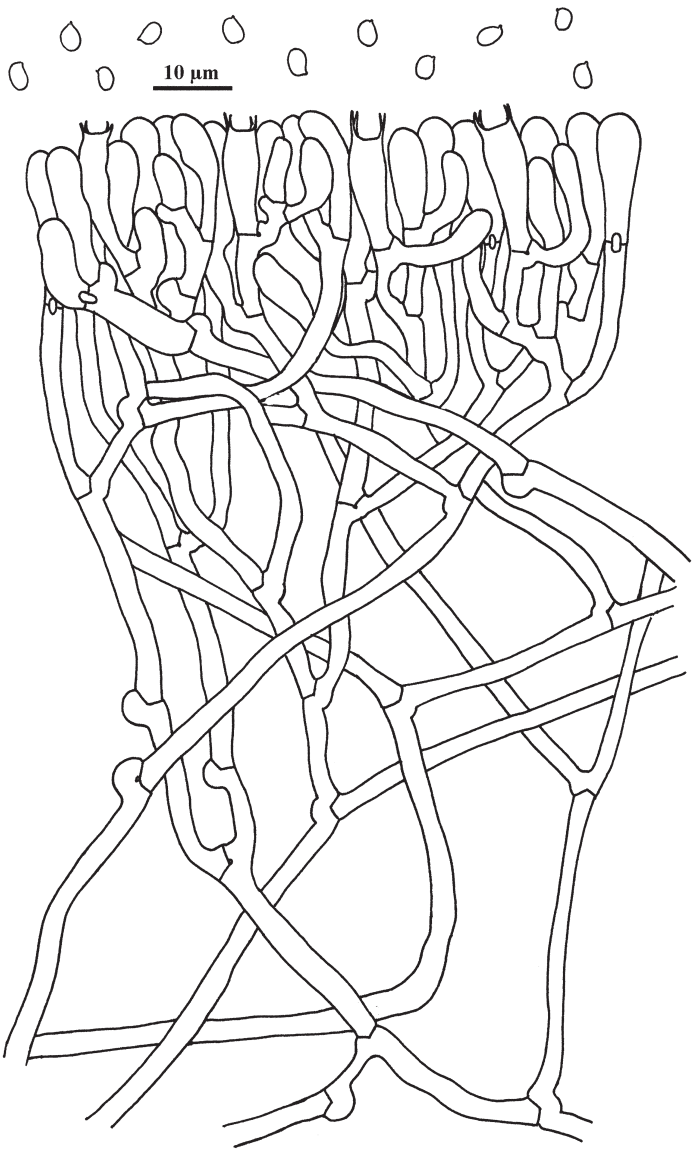

Plate 3. *Amylocorticiellum luteolum* (coll. LR 15952, isotype)

basidiospores. Morphologically close to *A. subillaqueatum,* it differs in slightly smaller basidiospores with a bluish Melzer's reaction.

Known only from the type locality in Colombia.

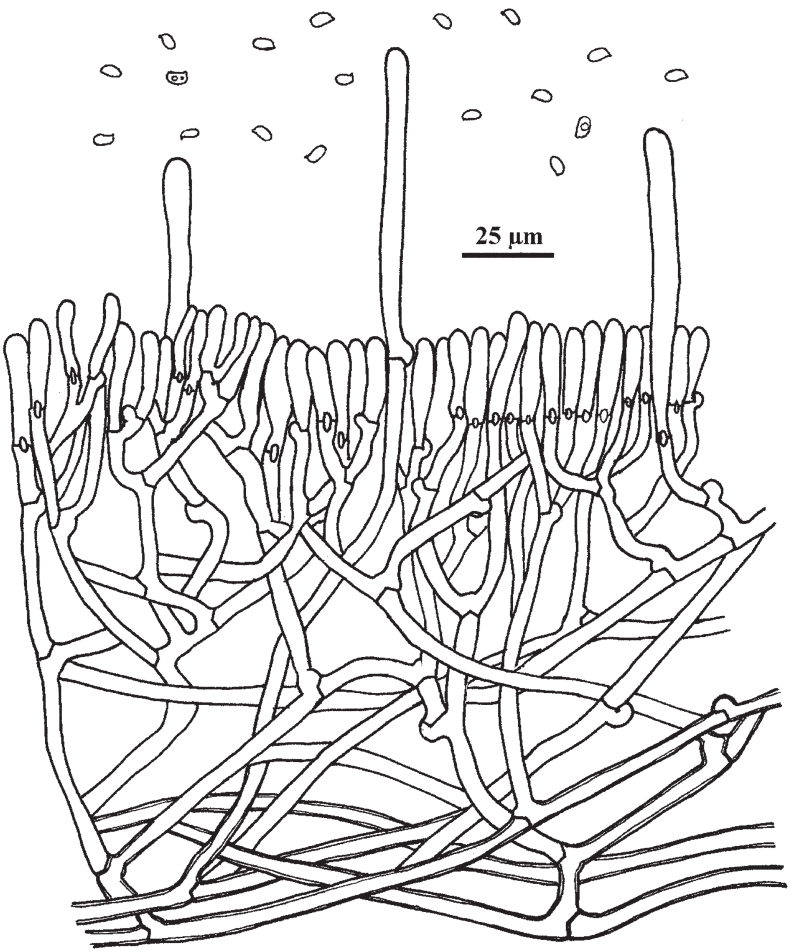

Plate 4. *Amylocorticiellum molle* (coll. SPG 2999)

Amylocorticiellum molle (Fr.) Spirin & Zmitr., Mikol. Fitopatol. 36(1): 23, 2002.

≡ *Thelephora mollis* Fr., Syst. mycol. (Lundae) 1: 443, 1821.

≡ *Hypochniciellum molle* (Fr.) Hjortstam, Mycotaxon 13(1): 125, 1981.

≡ *Leucogyrophana mollis* (Fr.) Parmasto, Eesti NSV Tead. Akad. Toim., Biol. seer 16(4): 385, 1967.

Specimens examined – **ARGENTINA**. **Chubut**: Futaleufú, Valle 16 de Octubre, close to Los Rifleros river, on dead wood of *Austrocedrus chilensis* (*Cupressaceae*), 15.X.2010, leg. S.P. Gorjón, *SPG 2991*.

Comments – *Amylocorticiellum molle* is characterized by the narrowly ellipsoid basidiospores that are greyish in Melzer's reagent and the distinct cylindrical cystidia (Eriksson & Ryvarden 1976, Bernicchia & Gorjón 2010).

Known from Europe, Canary Islands and North America. New to the Southern Hemisphere.

Amylocorticiellum oblongisporum (G. Cunn.) Gorjón, Gresleb. & Rajchenb., **comb. nov.** Plates 1,4

MycoBank **MB519221**

≡ *Odontia oblongispora* G. Cunn., Trans. Roy. Soc. New Zealand 86(1–2): 95, 1959.

≡ *Hypochniciellum oblongisporum* (G. Cunn.) Gresl. & Rajchenb., Mycotaxon 73: 14, 1999.

Description – Basidiome resupinate, hypochnoid, detachable from the substrate, 100–250 µm thick. Hymenial surface at first smooth, then irpicoid to clearly hydnoid with smooth areas between the aculei, whitish to pale yellow or yellowish with chestnut zones; aculei conical or slightly flattened, 0.5–1.5(–2) mm long. Subiculum cottony, white, 150–200 µm thick. Margin white or paler than the hymenial surface, loosely myceliar or pellicular, detachable from the substrate. Hyphal system monomitic, hyphae with clamps, 2–4 µm in diam., thin-walled in the subhymenium, thick-walled in the subiculum and in the core of the aculei, parallel and compact in the aculei, loosely arranged in the subiculum. Septocystidia little differentiated, scarce, arising from the subiculum and projecting up to 30 µm. Basidia clavate, 15–25 × 4–5 µm, with 4 sterigmata and a basal clamp. Basidiospores ellipsoid, 4–5(–5.5) × 2.5–3 µm, thick-walled, smooth, amyloid, cyanophilous.

Specimens examined – **ARGENTINA**. **Chubut**: Los Alerces National Park, southern arm of Menéndez lake, on *Fitzroya cupressoides* (*Cupressaceae*), 8.V.1998, leg. A. Greslebin, *AG 1625*. **Neuquén**: Los Lagos, Laguna Rosales, Lote 43, on *Nothofagus pumilio* stand, 2.XI.1997, leg. A. Greslebin, *AG 1214*. Nahuel Huapi National Park, Puerto Blest, Frias river, on *Pilgerodendron uviferum* (*Cupressaceae*), 30.V.2010, leg. S.P. Gorjón, *SPG 2933*. **NEW ZEALAND**. **Auckland**, Piha Valley, on *Agathis australis* (*Araucariaceae*), VIII.1953, leg. J.M. Dingley, *PDD 17980*. Upper Piha Valley, Waitakeres, VIII.1953, leg. J.M. Dingley, *PDD 17981,* **holotypus**. Waitakere, Waitakere Ranges, Spragg track, on *Agathis australis,* 2.VIII.1998, leg. M. Rajchenberg s.n. Rangitoto Is., on *Metrosideros excelsa* (*Myrtaceae*), VII.1950, leg. J.M. Dingley, *PDD 17984*. **Otago**, Alton Valley, Tuatapere, on *Podocarpus hallii* (*Podocarpaceae*), II.1954, leg. J.M. Dingley s.n.

Comments – The combination of a hypochnoid basidiome, a monomitic hyphal system with clamped generative hyphae, and small, smooth, thick-walled, amyloid spores supports combination in *Amylocorticiellum*. The hydnoid to irpicoid hymenophore with rather long aculei is a unique feature in the genus. However, some *Amylocorticiellum* species (e.g. *A. molle*) show a more or less merulioid hymenial configuration and, as in most other cases in

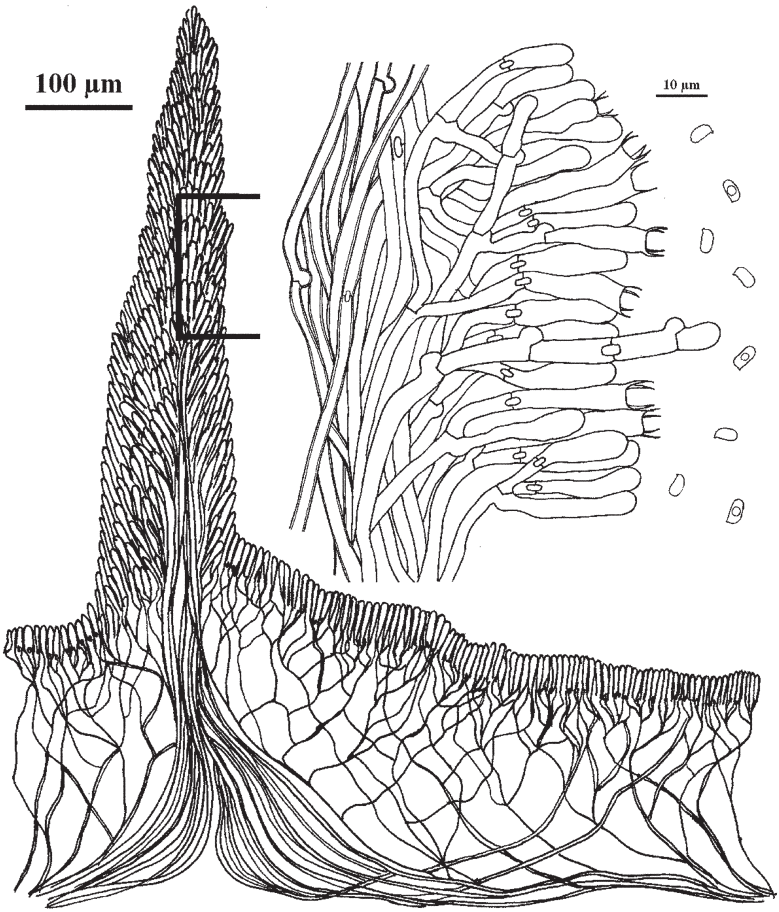

Plate 5. *Amylocorticiellum oblongisporum* (coll. SPG 2933)

corticioid homobasidiomycetes, hymenophore configuration is variable at the generic level (e.g. *Phlebia* Fr., *Hyphodontia* J. Erikss., *Phanerochaete* P. Karst.).

Known from New Zealand and Argentina (Patagonia).

Amylocorticiellum sinuosum Spirin & Zmitr., Mikol. Fitopatol. 36(1): 24, 2002.

Comments – *Amylocorticiellum sinuosum* is characterized by sinuous to constricted leptocystidia, long, sinuous to clavate basidia, and weakly amyloid ellipsoid basidiospores (Zmitrovich & Spirin 2002).

Known growing on *Pinus sylvestris* from the type locality in western Russia (Nizhegorod).

Amylocorticiellum subillaqueatum (Litsch.) Spirin & Zmitr., Mikol. Fitopatol. 36(1): 23, 2002.

≡ *Corticium subillaqueatum* Litsch., Annls mycol. 39(2/3): 128, 1941.

≡ *Hypochniciellum subillaqueatum* (Litsch.) Hjortstam, Mycotaxon 13(1): 126, 1981.

≡ *Leucogyrophana subillaqueata* (Litsch.) Jülich, Persoonia 8(1): 56, 1974.

Comments – *Amylocorticiellum subillaqueatum* is characterized by whitish to cream coloured or yellowish basidiomes, chlamydospores, and small ellipsoid basidiospores with a greyish Melzer's reaction. For a detailed description and illustration see Eriksson & Ryvarden (1976) and Bernicchia & Gorjón (2010).

Known from continental Europe, Great Britain, the Canary Islands, Russia, and North America.

Key to *Amylocorticiellum*

1a. Cystidia present (but generally few and little differentiated) 2
1b. Cystidia completely absent 4

2a. Hymenophore hydnoid to irpicoid, with septocystidia . . . . . ***A. oblongisporum***
2b. Hymenophore smooth to slightly merulioid, with non-septate leptocystidia 3

3a. Leptocystidia distinct, ca. 80–100 × 6–10 µm, spores 6–7 × 2.5–3.5 µm . . . ***A. molle***
3b. Leptocystidia slender 20–35 × 3–4 µm, spores 5.5–8 × 3–3.7 µm . . . . . ***A. sinuosum***

4a. Spores 5–9 µm long. 5
4b. Spores smaller, up to 4–4.5 µm long. 6

5a. Spores 6–9 × 4–6 µm, bluish in IKI . . . . . ***A. iaganicum***
5b. Spores 5–7 × 3–4 µm, invariable or greyish in IKI. . . . . ***A. cremeoisabellinum***

6a. Spores 3.5–4.5(–5) × (2–)2.5–3 µm, greyish in IKI, chlamydospores present in some specimens . . . . . ***A. subillaqueatum***
6b. Spores 2.5–3.25 × 2–2.5 µm, bluish in IKI, chlamydospores absent . . . . ***A. luteolum***

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